

Eureka – Archimedes Principle Worksheet

Name: _____ Date: _____

Group: _____ Group Role: _____

Objective: Measuring known objects and finding volumes and densities of unknown objects.

Materials:

- 1 ruler,
- 1 graduated cylinder (half filled with water),
- 1 Triple Beam Balance,
- 1 collection of sample materials (wood-2 sizes, steel, aluminum, plastic, glass)
- 1 unknown object,

First, measure dimensions and weights of all of the known objects with regular shapes and calculate the density of each.

Small Block of Wood

- Take the small block of wood and measure its length, width, and height in centimeters and record the values here:

Length: _____ Width: _____ Height: _____

- Next, calculate the volume of the block in cubic centimeters: _____
- Measure the mass of the block in grams. Record the value here: _____
- Calculate the density in grams per cubic centimeters: _____

Large block of wood

Do you think it has more mass than the small block? Explain.

Do you think it will have a different density than the small block? Why or why not?

- Measure the large block of wood and record your results below.

Length: _____ Width: _____ Height: _____

- Next, calculate the volume of the block in cubic centimeters: _____
- Measure the mass of the block in grams. Record the value here: _____
- Calculate the density in grams per cubic centimeters: _____

Was the density what you predicted? Why do you think this is?

New Samples

Choose two more samples to measure and record your results below.

Sample Name: _____

Length: _____ Width: _____ Height: _____

Volume: _____ Mass: _____ Density: _____

Sample Name: _____

Length: _____ Width: _____ Height: _____

Volume: _____ Mass: _____ Density: _____

Which of your objects will float on water? Explain why you know.

Water has a density of 1 g/cm^3 , so how can we tell what things will float on water?

Choose one of your objects that will sink in water and put it in the graduated cylinder. Measure how much the water level changed in milliliters and record that here.

Initial Volume: _____ Final Volume: _____

Displacement volume (Final-Initial): _____

How does this relate to the volume of your object? Why? Remember $1 \text{ mL} = 1 \text{ cm}^3$.

Mystery object

Just by looking at it and feeling it, what do you think it is made of?

Do you think it will float on water? Why or why not?

- Now measure the mass of your object using the balance and record that here.

Mass: _____

- Now put the object in the graduated cylinder. Measure the displacement and record it.

Initial Volume: _____ Final Volume: _____

Displacement volume (Final - Initial): _____

- Now calculate the density of the object: _____

Did your prediction of whether it will float come true? Explain.

Analyze and Conclude

Why are the volume of an object measured in cubic centimeters and measured by a graduated cylinder considered equivalent?

How does this lab demonstrate how Archimedes proved the King's crown was not made with all gold?